Amendments to the Specification:

With respect to the International Application as published on June 9, 2005:

Please replace the title on page 1, line 1 with the following:

HEAT-SHRINK ~~JOINTING~~TUBE

Please add on page 1, line 2 the following:

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

Please replace the language appearing on page 1, lines 3-5 with the following:

The present invention relates to a heat-shrink ~~jointing~~ tube for an electrical power cable, in particular a medium voltage power cable operating at voltages typically between 12 kV and 42 kV inclusive.

Please add on page 1, line 6 the following:

SUMMARY OF THE PRIOR ART

Please replace the language appearing on page 1, line 7 through page 2, line 14 with the following:

Heat-shrink ~~jointings~~ tubes for electrical power cables use heat-shrinkable polymeric technology to provide one or more heat recoverable sleeves having appropriate electrical characteristics which are shrunk into position around ~~the~~ ends of cables that have been

electrically connected together. There are two main types of heat-shrink ~~electrical cable jointing~~ tubes currently in use for medium voltage (MV) electrical power cables.

A first type of ~~jointing, as~~ heat-shrink tube is shown in Figs. 1a and 1b ~~hereto,~~ and comprises a two-piece system that uses only heat-shrink materials to provide two heat recoverable sleeves that respectively provide insulation and ~~the~~ an external conductive layer, which is required ~~in~~ at the cable joint. An insulating-only sleeve 1 is installed first around the cable joint. A second, dual-layer sleeve 2 with a conductive outer layer 3 and an insulating inner layer 4 is then installed over ~~the~~ a top of first sleeve 1 to provide a thicker insulating layer ~~4~~ and the required conductive outer layer ~~3~~.

This ~~jointing~~ heat-shrink tube is limited by the fact that it is not practical to manufacture sleeves comprising a thick wall of thermoplastic, heat-shrink material owing both to manufacturing difficulty, and to the problem posed in heating through the entire wall thickness of a thick tube sufficient to recover it, without over-heating the outer surface to the extent that damage occurs. This means that the maximum wall thickness of the insulating material is limited making it necessary to use multiple of the insulating-only sleeves 1 to create the required insulation thickness. Typically, two such sleeves are required for power cables operating at voltages up to around 24 kV. However, three or more of the insulating-only sleeves 1 are required if a higher voltage rating is required for the joint. The use of multiple insulating-only sleeves 1, however, causes its own problems not only because installation is prolonged but also because the increased number of interfaces between the multiple insulating-only sleeves 1 can lead to electrical problems as a result of air entrapment, contamination of the cable joint and the like.

~~The~~ A second type of ~~jointing, as~~ heat-shrink tube is shown in Fig. 2~~,~~ and comprises a single-piece, elastomeric insulating ~~jointing~~ sleeve 5 in which a conducting heat-shrink outer layer 6 is used as a ~~hold-out~~ support mechanism for an elastomeric, insulating inner layer 7. The insulating inner layer 7 exerts an elastic force to shrink the ~~jointing~~ insulating sleeve 5 but is prevented from doing so by the conductive, thermoplastic outer layer 6 that remains rigid until it is heated.

This second type of ~~jointing~~ heat-shrink tube obviates the problems created by the use of multiple sleeves by replacing the inner thermoplastic insulating sleeve ~~by an elastic~~ with the elastomeric insulating inner layer 7 that can recover without needing heat. This ~~elastic~~ elastomeric insulating inner layer 7 is retained in an expanded form by the ~~outer~~ rigid conductive outer layer 6 that prevents recovery of the ~~jointing~~ insulating sleeve 5 until the outer layer 6 is heated during installation. However, there are two main problems with this system. First, the elastomeric insulating inner layer 7 is slower to recover than the heat-shrink materials used in the first system. Second, because the ~~elastic~~ elastomeric insulating inner layer 7 is not rigid, the only mechanism which prevents its recovery prior to installation is the rigid~~,~~ conductive outer layer 6. This means that the outer layer 6 is usually thicker than would otherwise be required for electrical reasons, thus adding materials and therefore cost to the product.

Please add on page 2, line 15 the following:

SUMMARY OF THE INVENTION

Please replace the language appearing on page 2, lines 16-24 with the following:

The object of the present invention is to provide a heat-shrink ~~jointing~~ tube for an electrical power cable that overcomes or substantially mitigates the aforementioned problems of conventional ~~jointing systems~~heat-shrink tubes.

According to the present invention there is provided a ~~heat-shrinkable jointing~~ heat-shrink tube for an electrical power cable comprising a sleeve or other hollow article having an electrically insulating inner layer, an electrically conductive outer layer, and between the inner and outer layers a thermoplastic mid-layer which can be softened by application of heat to the said sleeve or article to cause and/or permit dimensional recovery thereof.

Please replace the language appearing on page 2, line 29 through page 3, line 15 with the following:

The thermoplastic mid-layer is preferably electrically insulating and/or preferably substantially rigid, by which is meant at least sufficiently rigid to retain the inner layer in a radially expanded state prior to recovery. When used with the preferred elastomeric inner layer, softening of the mid-layer by the application of heat may permit the elastomeric recovery force of the expanded inner layer to shrink the sleeve or article. It will often be preferred that the mid-layer itself be heat-shrinkable to cause or contribute to the dimensional recovery of the sleeve or article. The mid-layer accordingly may be made from heat-shrinkable thermoplastic materials ~~known per se~~, for example semi-crystalline polyolefins or olefin co-polymers, which are well known and require no further explanation for those familiar with heat-shrink polymer technology. The usual cross-linking agents and other additives, for example ~~colourings~~colorings,

fillers, and antioxidants, may optionally be included in the usual quantities as known in the art ~~per se~~ in all ~~three~~ of the layers.

The conductive outer layer of the sleeve or article is preferably formed of polymeric material, for example the thermoplastics mentioned above, containing appropriate amounts of electrically conductive carbon blacks and/or other suitable electrically conductive fillers, as known in the art ~~per se~~.

Examples of suitable compositions for the ~~three~~ layers ~~of articles~~ according to the present invention include the following, using known materials of the kinds indicated in proportions by weight selected within the specified ranges to total 100%:

Please replace the language appearing on page 4, lines 1-6 with the following:

The ~~three~~-layered sleeve or article of the ~~jointing~~ heat-shrink tube according to this invention is preferably of tubular, one-piece construction. The term "tubular" is used to indicate an elongate hollow article, which may be a substantially straight sleeve of substantially uniform round or oval cross-section, but is not necessarily limited to any particular longitudinal outline or uniformity of transverse dimensions.

Please add on page 4, line 29 the following:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the language appearing on page 4, line 32 through page 5, line 4 with the following:

Figs. 1a and 1b are respectively transverse sectional views of ~~the pieces of~~ a ~~first,~~ conventional two-piece heat-shrink ~~jointing as described above~~tube;

Fig. 2 is a transverse sectional view of a ~~second~~ conventional~~,~~ one-piece heat-shrink ~~jointing as also described above~~tube; and

Fig. 3 is a transverse sectional view of a heat-shrink ~~jointing~~ tube in accordance with the present invention.

Please add on page 5, line 5, the following:

DETAILED DESCRIPTION OF THE INVENTION

Please replace the language appearing on page 5, lines 6-31 with the following:

A heat-shrink ~~jointing~~ tube as shown in Fig. 3 comprises a sleeve 10 in the form of a one-piece, tubular extrusion which is made up of ~~three~~ substantially co-axial radial layers~~, 11, 12 and 13~~ consisting of an inner layer 11, an outer layer 13, and a mid-layer 12. The ~~innermost~~ inner layer 11 comprises an electrically insulating layer comprised of an elastomeric material. The ~~outermost~~ outer layer 13 is thin and made of a conducting material. Between the inner and outer layers 11, ~~and~~ 13 is ~~a~~ the rigid, thermoplastic mid-layer 12. The mid-layer 12 is recovered by the application of heat thereto and therefore prior to installation of the ~~jointing~~ sleeve 10 acts as a ~~hold-out~~ support to retain the elastomeric inner layer 11 in a radially expanded state. In addition, the mid-layer 12 is ~~preferably~~ comprised of an electrically insulating material which provides the

advantage that the elastomeric, insulating inner layer 11 can be made thinner than would otherwise be the case.

As aforementioned, because the thermoplastic mid-layer 12 is rigid prior to its recovery and therefore during storage conditions, the thickness of the conductive outer layer 13 can be made thinner, for example 0.5mm as compared to 4mm in the prior art described above. The mid-layer 12 may provide adequate ~~hold-out performance~~ support at a thickness of only 5mm, allowing a reduction in the thickness of the elastomeric inner layer ~~thickness~~11, for example from the previously known 11mm to only 6mm, thus maintaining a total 11mm insulation thickness. The resulting wall thickness of all ~~three~~ of the layers combined may thus be only 11.5mm, which is significantly less than the total 15mm thickness of the previously known sleeves having the dual-function conductive-and-~~hold-out~~support layer.

A further advantage arises from the fact that as the ~~insulation~~ insulating layer of the ~~jointing~~ sleeve 10 is made up of the inner layer 11 and the mid-layer 12, the mid-layer 12 does not need to be thick-walled, as in the prior art described above with reference to Fig. 1b. This means that a single tubular sleeve can be used ~~as a jointing~~ even for power cables operating at higher voltages without multiple sleeves being required.

Also, as the thermoplastic mid-layer 12 has a faster installation speed than the elastomeric insulation material, the replacement of some of the elastomeric material by an insulating thermoplastic material in the mid-layer 12 of the present invention improves the recovery speed of the jointing as compared with the prior art.

Please replace the language appearing on page 6, lines 4-15 with the following:

It will thus be appreciated that the ~~jointing~~ heat-shrink tube of the invention comprises a hybrid ~~jointing~~ sleeve that combines both thermoplastic and elastomeric layers to alleviate the weaknesses of purely elastomeric ~~jointing~~ sleeves and of those elastomeric ~~jointings~~ sleeves which only comprise two layers.

In view of the foregoing advantages, it is estimated that there will be potential installation speed improvements of around 30%, perhaps as much as 50%, compared to the elastomeric insulating ~~jointing~~ sleeve 5 described with reference to Fig. 2. Also, the ~~a single~~ sleeve ~~jointing~~ 10 in accordance with the present invention should be sufficient for electrical power cables operating at voltages between 12 kV and 42 kV inclusive as compared to the multiple sleeve arrangements required with heat-shrink-only ~~jointings~~ sleeves 1, 2 as described with reference to ~~the Figures~~ Figs. 1a and 1b.

Please replace the heading on page 7, line 1 with the following:

~~CLAIMS~~WHAT IS CLAIMED IS: